



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/713,415

11/14/2003

Sherman (Xuemin) Chen

15225US01

2739

23446

7590

04/22/2008

MCANDREWS HELD & MALLOY, LTD

500 WEST MADISON STREET

SUITE 3400

CHICAGO, IL 60661

EXAMINER

CHAI, LONGBIT

ART UNIT

PAPER NUMBER

2131

MAIL DATE

DELIVERY MODE

04/22/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/713,415

**Applicant(s)**

CHEN ET AL.

**Examiner**

LONGBIT CHAI

**Art Unit**

2131

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 March 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-48 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-48 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Currently pending claims are 1 – 48.

### *Response to Arguments*

2. Applicant's arguments with respect to the subject matter of the instant claims have been fully considered but are not persuasive.
3. As per claim 31, Applicant asserts Sprunk does not teach (a) "a scrambler coupled to said mapper" since the connections shown in FIG. 4 of Sprunk do not show that "a scrambler" and "a mapper" (Remarks: Page 18 / 1<sup>st</sup> Para / Line 11 – 12) and (b) Sprunk does not teach a DES generator is a mapper since DES is the abbreviation for 'Data Encryption Standard' and it is to be assumed that the 'DES generator 420' operates in accordance with well-known DES operation principles (Remarks: Page 17 / 1<sup>st</sup> Para / Line 5 – 8). Examiner respectfully disagrees because, according to MPEP 2111, the broadest and reasonable claim interpretations must be made by the Examiner where Sprunk teaches double-stage DES operation (Sprunk: Figure 4) and the DES operations constituted with substitution / permutation / swapping functional stages along with the key hashing function, as shown in Figure 4, is qualified to provide mapping / scrambling functions to meet the claim limitations as recited in the claim.
4. As per claim 1, Applicant argues Testardi does not provide any support for "secure key" and hence, the Applicant believes to have overcome the rejection to the Applicant's claim limitation of "producing a secure key" (Remarks: Page 20 / 2<sup>nd</sup> Para / Line 6 – 9). Examiner respectfully disagrees because (a) Testardi teaches that once the generated electronic key is received and authenticated, the premium functionality is permanently enabled (Testardi: Column 6 Line 49 – 51) and (b) the key authentication indeed supports the desired secure key function.

Art Unit: 2131

5. Further more, as per claim 1, Applicant asserts the Office Action does not establish a prima facie conclusion of obviousness for 103 combination between the Testardi and Sprunk references (Remarks: Page 22 / Line 3 – 4). Examiner respectfully disagrees because it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Sprunk within the system of Testardi since (a) Testardi teaches a method for generating a security key for a printer device from an input device serial number (Testardi: Column 6 Line 29 – 31) and (b) Sprunk teaches an enhanced security mechanism for generating a cryptographic key to maintain a high level of security against hostile attackers by incorporating multiple security input key variations in addition to an input initial vector as well as a common encryption engine that can be adapted to different key size requirements (Sprunk: Para [0002], Para [0007] / Last sentence, Para [0041] and [0007]).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraph of 35 U.S.C. 102 that forms the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 31 and 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Sprunk et al. (U.S. Patent 2003/0007644).

As per claim 31 and 45, Sprunk teaches a system for producing a secure key, the system comprising:

Art Unit: 2131

a mapper (Sprunk: Figure 4 / Element 420 / 425 and Para [0036]: the first stage of dual DES Key Generator is considered as a key mapper);

a scrambler coupled to said mapper (Sprunk: Figure 4 / Element 450 / 455 / 456 and Para [0039]: the second stage of dual DES key scrambler (along with the key hashing function) can be considered as the scrambling function – i.e. the DES operations constituted with substitution / permutation / swapping functional stages along with the key hashing function is qualified to provide mapping / scrambling functions to meet the claim limitations as recited in the claim);

a masker coupled to said mapper (Sprunk: Figure 4 / Element 435 / 437 and Para [0036]: the AND gate is considered as a masking function);

a key generator coupled to said scrambler mapper (Sprunk: Figure 4 / Element 465 / 470 and Para [0039]); and

an XOR operator coupled to said masker and said scrambler (Sprunk: Figure 4 / Element 460 and Para [0039]: the Adder (i.e. an equivalent XOR entity (Figure 4 / Element 460)) performs an exclusive ORing function).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A person shall be entitled to a patent unless –

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2131

7. Claims 1, 2, 6, 10 – 12, 16, 20 – 22, 26, 30, 35, 36, 40 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Testardi et al. (U.S. Patent 7,293,292), in view of Sprunk et al. (U.S. Patent 2003/0007644).

As per claim 1, 11, 21 and 35, Testardi teaches a method for producing a secure key (Testardi: Column 6 Line 29 – 31: a security key is generated for a printer device), the method comprising:

generating a first output key based on said at least said first input key, said second input key (see Sprunk below) and said third input key (Testardi: Column 6 Line 29 – 31 and Column 4 Line 60 – 65: the printer device's serial number is considered as the third input key), wherein said first output key is unique and differs from said at least said first input key (see Sprunk below) and said third input key is a key variation comprising a device identity (Testardi: Column 6 Line 29 – 31: the printer device serial number is qualified as the third input key as a key variation comprising a device identity – i.e. device serial number).

However, Testardi does not expressly disclose receiving at least a first input key, a second input key besides receiving a third input key to generate the output key.

Sprunk teaches receiving at least a first input key, a second input key and a third input key (Sprunk: Figure 4 and Para [0036]: Key-1, Key-2 are qualified as a first input key, a second input key, respectively and the IV (Initial Vector) is considered as one of key variation values and is qualified as a third input key).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Sprunk within the system of Testardi because (a) Testardi teaches a method for generating a security key for a printer device from an input device serial number (Testardi: Column 6 Line 29 – 31) and (b) Sprunk teaches an enhanced

security mechanism for generating a cryptographic key to maintain a high level of security against hostile attackers by incorporating multiple security input key variations in addition to an input initial vector as well as a common encryption engine that can be adapted to different key size requirements (Sprunk: Para [0002], Para [0007] / Last sentence, Para [0041] and [0007]).

Accordingly, Testardi in view of Sprunk teaches wherein said first output key is unique and differs from said at least said first input key (Sprunk: Figure 4, Para [0017] Line 4 – 5 and Para [0036] Line 12: (a) the IV, Key 1 and Key 2 are known and DES generator 420 to generate a key that is used, in turn, by DES generator 425 to generate another key (Para [0036] Line 12) – i.e. the stage of dual DES generator generates a different / another key from the input key-1 and input key-2; Examiner notes another key, as per its context value or the stored location of the key, can be broadly interpreted as a different key to meet the claim language and (b) Sprunk teaches the desirable output key should not be repeated (Para [0017] Line 4 – 5).

As per claim 2, 12, 22 and 36, Testardi as modified teaches said first input key is a customer key, and said second input key is a customer key selection (Sprunk: Para [0036] and Para [0037]: The IV, Key 1 and Key 2 are known and supplied, for example, by a governmental agency – the customer is government agency and the IV is consider as a key variation).

As per claim 6, 16, 26 and 40, Testardi as modified teaches mapping said at least said first input key, said second input key and said third input key to generate mapped output key data (Sprunk: Figure 4 / Element 420 / 425 / 427 and Para [0036]: the output key data from the first stage of dual DES key generator at Figure 4 / Element 427 is considered as mapped output key data to meet the claim language).

As per claim 10, 20, 30 and 44, Testardi as modified teaches transferring said generated first output key to an encryption engine that utilizes said generated first output key to encrypt information (Sprunk: Figure 3 / Element 340 and Para [0035] Line 9 – 11: the new output key is used to encrypt the information).

8. Claims 3 – 5, 13 – 15, 23 – 25 and 37 – 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Testardi et al. (U.S. Patent 7,293,292), in view of Sprunk et al. (U.S. Patent 2003/0007644), and in view of Schneier ("Applied Cryptography, Second Edition", 1996).

As per claim 3, 13, 23 and 37, Testardi as modified teaches the desirable output key should be unique (Sprunk: Para [0017] Line 4 – 5: the output key should not be repeated). However, Testardi as modified does not disclose expressly the desirable output key is not equivalent to said at least said first input key.

Schneier teaches the desirable output keys differ from said at least said first input key (Schneier: Page 282, 2<sup>nd</sup> Para / Line 3: a complementary key is interpreted as an equivalent key and should be tested and avoided).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Schneier within the system of Testardi as modified because (a) Testardi teaches a method for generating a security key for a printer device by using an input key variation such as device serial number (Testardi: Column 6 Line 29 – 31) and (b) Schneier teaches a complementary key is interpreted as an equivalent key and should be tested and avoided being used as an input key variation (Schneier: Page 282, 2<sup>nd</sup> Para / Line 3).

According Testardi as modified teaches:



determining whether said first output key is at least one of a unique key and is not equivalent to said at least said first input key (Sprunk: Para [0017] Line 4 – 5 & Para [0036] & Schneier: Page 282, 2<sup>nd</sup> Para / Line 3: (a) Sprunk teaches the desirable output key should be unique (Para [0017] Line 4 – 5: the output key should not be repeated (b) Schneier teaches the users should be warned unless the output key is not a complement key – i.e. a complementary key is interpreted as an equivalent key and should be tested and avoided).

if said first output key is at least one of a non-unique key and is equivalent to said at least said first input key, generating a second output key based on a modified one of at least one of said first input key, said second input key and said third input key (Sprunk: Figure 4, Para [0037] – [0039] and Para [0041]: Examiner notes the prior-art teaches generating a second output key (Figure 4 / Element 465) from the first output key (Figure 4 / Element 427) regardless the outcomes of the IF condition that can meet the claim limitation since the IF-NOT (i.e. ELSE) condition is not recited in the claim and the prior-art evidently always covers the IF condition by generating a second output key regardless – i.e. the original contribution from the first input key, second input key or third input key is modified by (a) using a feedback loop to replace the IV value via a switch (Figure 4 / Element 417), and (b) the key space size variable (Figure 4 / Element 430) is also used as a key variation for modification purpose and the subsequent one-way key hashing function (Figure 4 / Element 456) is further employed to generate a second output key to avoid a weaken output key).

As per claim 4, 14, 24 and 38, Testardi as modified teaches determining whether said second output key is at least one of a unique key and differs from said at least said modified one of at least one of said first input key, said second input key and said third input key (Sprunk: Para [0017] Line 4 – 5 and Para [0036] & Schneier: Page 282, 2<sup>nd</sup> Para / Line 3: (a) Sprunk

teaches the desirable output key should be unique (Para [0017] Line 4 – 5: the output key should not be repeated (b) Schneier teaches the users should be warned unless the output key is not a complement key – i.e. a complementary key is interpreted as an equivalent key and should be tested and avoided).

As per claim 5, 15, 25 and 39, Testardi as modified teaches said first output key and said second output key are not weak or semi-weak keys (Sprunk: Figure 4, Para [0037] – [0039], Para [0041], Para [0029] Line 1 – 4 and Para [0007]: the selection and distribution may also be non-random and therefore, the output key has the key-bit randomly distributed over a key space corresponding to B-bit keys again from N-bits (Para [0037] – [0039] and Para [0041]), which is thereby not weaken for the purpose against hostile attackers (Para [0007] Line 13 – 15)).

9. Claims 7 – 9, 17 – 19, 27 – 29 and 41 – 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Testardi et al. (U.S. Patent 7,293,292), Sprunk et al. (U.S. Patent 2003/0007644), in view of Bennett et al. (U.S. Patent 4,864,615).

As per claim 7, 17, 27 and 41, Testardi as modified does not disclose expressly generating an intermediate key based on said first input key.

Bennett teaches generating an intermediate key based on said first input key (Bennett: Column 6 Line 65 – 67 / Line 59 – 62 and Figure 2 / Element 18 & 42: a first intermediate key is generated based on the first-key (pre-key) associated with a DES key encryptor).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Bennett within the system of Testardi as modified because (a) Testardi teaches a method for generating a security key for a printer

device by using an input key variation such as device serial number (Testardi: Column 6 Line 29 – 31) and (b) Bennett teaches a key security system for reproducing secure cryptography keys by using distributed key generation data and a distributed encrypted pre-key with a secured chain of protection for generated keys (Bennett: Column 2 Line 18 – 21, Column 3 Line 43 – 46 Column 6 Line 65 – 67 / Line 59 – 62).

As per claim 8, 18, 28 and 42, Testardi as modified teaches scrambling said generated intermediate key and said generated mapped output key data to create a scrambled output (Sprunk: Figure 4 / Element 450 / 455 / 456 and Para [0039]: the second stage of dual DES key scrambler (Figure 4 / Element 450 / 455) is qualified as a scrambler with two input data: (a) a generated intermediate key of Key-3 or Key-4 from the first key and (b) the output data of AND gate at Figure 4 / Element 437 sourced from the generated mapped output key data).

As per claim 9, 19, 29 and 43, Testardi as modified masking at least a portion of said generated mapped output key data (Sprunk: Figure 4 / Element 435 / 437 and Para [0036]: the AND gate is considered as a masking function); and exclusive ORing said masked at least said portion of said generated mapped output key data and said scrambled output to generate said first output key (Sprunk: Figure 4 / Element 460 and Para [0039]: the adder (i.e. XOR entity of Figure 4 / Element 460) performs an exclusive ORing function on the scrambled output at Figure 4 / Element 456 derived from the second stage of dual DES key scrambler and the output data of AND gate at Figure 4 / Element 437 sourced from the generated mapped output key data).

Art Unit: 2131

10. Claims 32 – 34 and 46 – 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sprunk et al. (U.S. Patent 2003/0007644), in view of Naclerio (U.S. Patent 7,028,014).

As per claim 32 and 46, Sprunk teaches a key output of XOR operator (Sprunk: Figure 4 / Element 460 and Para [0039]: the adder (i.e. XOR entity (Figure 4 / Element 460)) performs an exclusive ORing function) and transferring said generated first output key to an encryption engine that utilizes said generated first output key to encrypt information (Sprunk: Figure 3 / Element 340 and Para [0035] Line 9 – 11: the new output key is used to encrypt the information).

However, Sprunk does not disclose expressly at least one processor coupled to an output of said XOR operator.

Naclerio teaches at least one processor coupled to an output of said XOR operator (Naclerio: Column 4 Line 1 – 9: encrypting the data and storing it again in the memory – this encryption is performed by the processor executing encryption software in the memory (ROM) or optionally be performed by an encryption engine).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Naclerio within the system of Sprunk because (a) Sprunk teaches transferring the output key to an encryptor for encrypting information (Sprunk: Figure 3 / Element 340 and Para [0035] Line 9 – 11) and (b) Naclerio teaches a typical structure of an encryptor that can perform encryption functions (Naclerio: Column 4 Line 1 – 9).

As per claim 33 and 47, Sprunk as modified teaches an encryption engine that is coupled to an output of said XOR operation (Sprunk: Figure 4 / Element 460 and Para [0039]: the adder (i.e. XOR entity (Figure 4 / Element 460)) performs an exclusive ORing function) and

transferring said generated first output key to an encryption engine that utilizes said generated first output key to encrypt information (Sprunk: Figure 3 / Element 340 and Para [0035] Line 9 – 11: the new output key is used to encrypt the information).

As per claim 34 and 48, Sprunk as modified teaches a memory coupled to at least one of said encryption engine and said at least one processor (Naclerio: Column 4 Line 1 – 9: encrypting the data and storing it again in the memory – this encryption is performed by the processor executing encryption software in the memory (ROM) or optionally be performed by an encryption engine).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LONGBIT CHAI whose telephone number is (571)272-3788. The examiner can normally be reached on Monday-Friday 9:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R. Sheikh can be reached on 571-272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Longbit Chai/  
Longbit Chai Ph.D.  
Primary Examiner, Art Unit 2131  
4/19/2008